

## CLAIMS

1. A coating pressure feed roller comprising:

a solid cylindrical body being solid except an axial center hole passed through the axial center of said solid cylindrical body, and radial holes radially extended from a plurality of positions of said axial center hole; and

a roller brush applied to the outer periphery of said solid cylindrical body.

10 2. A coating pressure feed roller comprising:

a plurality of divided roller brush assemblies each formed with a solid cylindrical body being solid except an axial center hole passed through the axial center of said solid cylindrical body, and radial holes radially extended from a plurality of positions of said axial center hole, and a roller brush applied to the outer periphery of said solid cylindrical body;

an elastic member by which said divided roller brush assemblies are pulled to each other; and

20 a flexible tube passing through the axial center holes of all of said divided roller brush assemblies;

wherein holes formed in said flexible tube are aligned with said radial holes.

3. A coating pressure feed roller according to claim 1 or

2, wherein a groove extending in the circumferential direction, which is connected to the outlets of said radial holes, is formed in a surface of said solid cylindrical body.

5 4. A roller coating device according to claim 1 or 2, comprising:

a coating pressure feed roller defined by any of claims 1 to 3;

coating-material press feeding pipes connected to both  
10 ends of the axial center hole of said solid cylindrical body of said coating pressure feed roller; and

an arm part for supporting said coating pressure feed roller at both ends of said coating pressure feed roller.

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5. A curved-surface operable roller coating device comprising:

a coating pressure feed roller;

coating-material press feeding pipes for pressure feeding  
20 the interior of said coating pressure feed roller from both ends of said coating pressure feed roller;

an arm part for supporting said coating pressure feed roller at both ends of said coating pressure feed roller;

a turnable support mechanism for supporting said arm part

such that said arm is rotatable in a plane parallel to a vertical surface including the axis of said coating pressure feed roller; and

a vertically movable support mechanism for supporting said arm part such that said arm part is vertically movable.

6. A curved-surface operable roller coating device in which said coating pressure feed roller defined in claim 5 is said coating pressure feed roller defined by any of claims 1 to 3.

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7. An automatic coating apparatus of the roller type comprising:

a three-dimensionally moving robot being movable in three dimensional directions, said curved-surface operable roller coating device defined by claim 5 or 6 being attached to the tip of arms of said robot;

a robot control unit for controlling said three-dimensionally moving robot;

a pump control unit for controlling a flow rate of a coating material to be pressure fed to said curved-surface operable roller coating device.

8. A automated coating apparatus having a coating material tank supplied with a coating material from a coating material

can, a coating device for coating a coating material on an object to be coated, a piping ranging from said coating material tank to said coating device, and a pump, provided in said piping, for feeding the coating material to said coating device,

5 wherein said coating device comprising:

a coating pressure feed roller including a solid cylindrical body being solid except an axial center hole passed through the axial center of said solid cylindrical body, and radial holes radially extended from a plurality of positions  
10 of said axial center hole, and a roller brush applied to the outer periphery of said solid cylindrical body;

a curved-surface operable roller coating device including coating-material press feeding pipes connected to both ends of the axial center hole of said solid cylindrical body of said  
15 coating pressure feed roller, an arm part for supporting said coating pressure feed roller at both ends of said coating pressure feed roller, a turnable support mechanism for supporting said arm part such that said arm is rotatable in a plane parallel to a vertical surface including the axis of said coating pressure  
20 feed roller, and a vertically movable support mechanism for supporting said arm part such that said arm part is vertically movable;

a three-dimensionally moving robot being movable in three dimensional directions, said curved-surface operable roller

coating device defined by claim 5 or 6 being attached to the tip of arms of said robot;

a robot control unit for controlling said three-dimensionally moving robot; and

5 a coating material flow rate control unit for controlling a flow rate of a coating material to be pressure fed to said curved-surface operable roller coating device.

9. A automated coating apparatus having a coating material  
10 tank supplied with a coating material from a coating material can, a coating device for coating a coating material on an object to be coated, a piping ranging from said coating material tank to said coating device, and a pump, provided in said piping, for feeding the coating material to said coating device,  
15 wherein said coating device comprising:

a coating pressure feed roller including a solid cylindrical body being solid except an axial center hole passed through the axial center of said solid cylindrical body, and radial holes radially extended from a plurality of positions  
20 of said axial center hole, and a roller brush applied to the outer periphery of said solid cylindrical body;

a curved-surface operable roller coating device including coating-material press feeding pipes connected to one end of the axial center hole of said solid cylindrical body of said

coating pressure feed roller, an arm part for supporting said coating pressure feed roller at one end of said coating pressure feed roller, a turnable support mechanism for supporting said arm part such that said arm is rotatable in a plane parallel to a vertical surface including the axis of said coating pressure feed roller, and a vertically movable support mechanism for supporting said arm part such that said arm part is vertically movable;

a three-dimensionally moving robot being movable in three dimensional directions, said curved-surface operable roller coating device defined by claim 5 or 6 being attached to the tip of arms of said robot;

a robot control unit for controlling said three-dimensionally moving robot; and

a coating material flow rate control unit for controlling a flow rate of a coating material to be pressure fed to said curved-surface operable roller coating device.

10. A automated coating apparatus according to claim 8 or 9, wherein a solution filter for removing foreign matters mixed into the coating material is provided in said piping ranging from said coating material tank to said coating device.

11. A automated coating apparatus according to claim 8 or 9,

wherein a liquid quantity stabilizer using a flow meter, for controlling a flow rate of coating material in order to eliminate a variation of a flow rate of coating material within said piping and to keep constant an amount of coating material coated by said coating device, is provided in said piping ranging from  
5 said coating material tank to said coating device.

12. A automated coating apparatus according to claim 8 or 9, wherein a heat exchanger for adjusting temperature of the coating  
10 material in said coating device to an optimum temperature and supplying said coating material temperature adjusted is provided in said piping ranging from said coating material tank to said coating device.

15 13. A automated coating apparatus according to claim 8 or 9, further comprising:

a return piping for returning the remaining coating material of said coating material having been fed from said coating material tank to said coating device, said remaining  
20 coating material being left while not used for coating.

14. A automated coating apparatus according to claim 8 or 9, wherein the fore end of said return piping is projected into a liquid level within said coating material tank and is bent

in the circumferential direction along the sidewall said coating material tank.

15. A automated coating apparatus according to claim 8 or 9,  
5 further comprising:

a coating material color select valve provided in said piping ranging from said coating material tank to said coating device;

a piping for guiding a detergent from a detergent tank  
10 to said coating material color select valve; and

a pump, provided in said piping, for supplying a detergent to said coating material color select valve.

16. A coating method for coating an object to be coated in  
15 a manner that a roller is rolled while a coating material is pressure fed from the interior of said roller to the outer periphery thereof, in which a predetermined long area is coated from one end to the other end by said coating pressure feed roller, said coating pressure feed roller is stopped at said other end,  
20 to coat a long area adjacent to said long area, said coating pressure feed roller is moved to one of the ends of said adjacent long area, and said long area is coated again toward said other end, and said coating operations are sequentially repeated to finally coat a broad area,



wherein as a first step, an area of said broad area except an area as a maximum corresponding to a width of said coating pressure feed roller, which is located inside from said both ends of said broad area is entirely coated by said coating method, and as a second step, said coating pressure feed roller is rolled from a first long area to a final long area in said uncoated area, while discharging no coating material or a small amount of coating material.

10 17. A coating method according to claim 16, wherein said coating pressure feed roller is rolled while discharging no coating material or a small amount of coating material, in a final long area in said broad area.

15 18. A coating method according to claim 16, wherein as the amount of coating material stagnating at said end increases, the width of the uncoated area is increased.

19. A coating method in which flat and curved portions to which said coating pressure feed roller is followable, such as hood, roof, trunk, bumper, fender or door of an automobile, is coated by said coating method defined by any of claims 16 to 18, and portions where said coating pressure feed roller is not followable, is coated manually by a brush or a roller, or

automatically by a coating robot including a small roller smaller than said coating pressure feed roller or a slit nozzle.

20. A coating method in use for an automobile, wherein in said  
5 coating method defined in claim 19 which includes at least one  
coating pressure feed roller for coating an object to be coated  
in a manner that a roller is rolled while a coating material  
is pressure fed from the interior of said roller to the outer  
periphery thereof, at least one of said hood, roof, trunk, bumper,  
10 fender and door is coated with a first coating pressure feed  
roller, and at least one of components other than said components  
coated by said first coating pressure feed roller is coated with  
a second coating pressure feed roller.